

PERCEPTION OF THE COMMUNITY ON THE LOCAL GOVERNMENT  
FAILURE FACTORS ON SUSTAINABLE SOLID WASTE  
MANAGEMENT IN A DEVELOPING COUNTRY

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## ABSTRACT

Studies on sustainable solid waste management (SSWM) have been done in developed countries and it is still a contentious issue in developing countries such as Indonesia. In Makassar City, municipal solid waste management (SWM) has become an interesting research arena as government policies could not guide waste management practice inclined towards SSWM. This study assessed the existing local government policies on SWM by identifying failure factors based on unit analysis. To achieve the research objectives, a convergent parallel mixed-method design was adopted. For quantitative data collection, random sampling of 341 households was used to answer questionnaires. Semi-structured interviews were conducted with 12 participants based on exhaustive results of the qualitative data. Descriptive and inferential statistical analyses of chi square and logistic regression were used in the analysis of quantitative data. On the other hand, qualitative data were analysed using a thematic approach supported by strength-weaknesses-opportunities-threats (SWOT) analysis. Data analyzed from the findings indicated that the existing effort to perform SSWM was ineffective. Furthermore, this study identified failure factors such as lack of financial and legal aspects, infrastructure, facilities, community awareness and capable government personnel. The findings also showed that government policies and household practices have significant relationship on the implementation SSWM. In addition, this study found that suitable policies and practices which the local authority must provide should include sufficient financial support and involvement of all SWM stakeholders towards the SSWM. Based on the findings, it is apparent that inadequate coordination exists among the various districts or sub-district levels and concerned local government agencies that has led to the weakening of the implementation SSWM at the household level. Based on the findings, it is recommended that the local authority revise and reformulate the policies and regulations towards the implementation of SSWM.

## ABSTRAK

Kajian keatas pengurusan sisa pepejal mapan (SSWM) telah dijalankan di negara-negara maju dan masih menjadi isu pertikaian di negara-negara membangun seperti Indonesia. Di Kota Makassar, pengurusan sisa pepejal perbandaran (SWM) telah menjadi arena penyelidikan menarik kerana dasar-dasar kerajaan tidak dapat memandu ke arah amalan pengurusan sisa yang cenderung kepada SSWM. Kajian ini menilai dasar-dasar kerajaan tempatan yang sedia ada bagi SWM dengan mengenal pasti faktor-faktor kegagalan berdasarkan analisis unit. Bagi mencapai objektif kajian, reka bentuk kaedah campuran bertumpu selari telah diguna pakai. Bagi pengumpulan data kuantitatif, 341 isi rumah secara pensampelan rawak telah digunakan untuk menjawab soal selidik. Temu bual separa berstruktur telah dijalankan keatas 12 orang responden berdasarkan hasil menyeluruh data kualitatif. Analisis statistik deskriptif dan inferensi khi kuasa dua serta regresi logistik digunakan dalam analisis data kuantitatif. Di samping itu, data kualitatif dianalisis menggunakan pendekatan tematik disokong dengan analisis kekuatan-kelemahan-peluang-ancaman (SWOT). Data yang dianalisis daripada dapatan kajian menunjukkan bahawa usaha yang sedia ada untuk melaksanakan SSWM adalah tidak berkesan. Selain itu, kajian ini mengenal pasti faktor-faktor kegagalan seperti kurangnya aspek kewangan dan undang-undang, infrastruktur, kemudahan, kesedaran masyarakat dan kakitangan kerajaan yang berkebolehan. Dapatan kajian juga menunjukkan bahawa dasar-dasar kerajaan dan amalan isi rumah mempunyai hubungan yang signifikan dalam pelaksanaan SSWM. Di samping itu, kajian ini mendapati bahawa dasar dan amalan yang sesuai yang perlu disediakan oleh pihak berkuasa ke arah SSWM harus merangkumi bantuan kewangan yang mencukupi dan penglibatan semua pihak berkepentingan dalam SWM. Berdasarkan dapatan kajian, adalah jelas bahawa terdapat kurang penyelarasan antara daerah-daerah atau peringkat sub-daerah dan agensi-agensi kerajaan tempatan yang berkenaan yang telah membawa kepada kelemahan pelaksanaan SSWM di peringkat isi rumah. Berdasarkan dapatan kajian, disyorkan agar pihak berkuasa tempatan menyemak dan merangka semula dasar-dasar dan peraturan ke arah pelaksanaan SSWM.

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## LIST OF ABBREVIATIONS

EU	- European Union
FDS	- Final Disposal site
GP	- Government Policy
HP	- Household Practice
IM	- Implementation
JICA	- Japan International Cooperation Agency
KPD	- Kilogram / Person / Day
LISA	- <i>Lihat Sampah Ambil</i> (a kind of local government that means once you see the garbage, you should take and throw to garbage bin)
LGAs	- Local Government Agencies
MGC	- Makassar Green and Clean
NIMBY	- Not In My Back Yard
PERDA	- Peraturan Daerah (Local Government Regulation)
RW	- Rukun Warga (Community or Association of Neighbourhood)
SKPD	- <i>Satuan Kerja Perangkat Daerah</i> (Regional Team Work Unit at Local Government)
SPSS	- Statistical Package for the Social Science
SSWM	- Sustainable Solid Waste Management
STP	- Sewage Treatment Plant
SWM	- Solid Waste Management
SWOT	- Strengths, Weaknesses, Opportunities, and Threats
TDS	- Temporary Disposal Site
UNEP	- United Nations Environment Programme
USA	- United State of America
YPN	- <i>Yayasan Peduli Negeri</i> (NGO that focuses on country)
3Rs	- Reduce, Reuse, Recycle

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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Research Background**

One major environmental issue faced by most cities of the developing countries is the municipal solid waste management. The rapid urbanization of cities in the third-world countries is primarily triggered by the unrelenting movement of population from rural to urban areas. The inadequacy of a comprehensive solid waste management program exacerbates and puts pressure on the urban environment. Thus, according to Zhuang, Wu, Wang, Wu, and Chen (2008) the institutionalization by the local government of a comprehensive and sustainable municipal solid waste management system becomes significantly necessary, and this includes the participation of the community as urban waste management stakeholders (Joseph, 2006). Some cities and metropolises in Japan, South Korea, including the city-state of Singapore, have effectively accomplished and advanced the system in solid waste management (Bai and Sutanto, 2002; Matsumoto, 2011; Hong Kong Environment Bureau, 2013) through technological innovations.

In Indonesia, solid waste management is a major concern of the government at all levels, as the local government have yet unable to accomplish sustainable solid waste management (SWM) practices, due to some constraints like institutionalizing operational policies, inadequate financial support, and the availability of infrastructure related to SWM (Dilla and Natsir, 2007). One of the most important enabling factors to accomplish sustainable municipal solid waste management is the adequacy of fundamental policy, particularly the policies at local government level.

Thus the policy adequacy, along with other factors, becomes an essential aspect to investigate.

Developing cities struggle with the basic requirement of sustainable solid waste management as waste generation continues to grow as the urban populace. In Bangladesh, the solid waste generated was estimated at 1.3 kg/household/day in 2007 with 0.25 kg/person/day and has been increasing overtime (Sujauddin, Huda, and Hoque, 2008). Most Asian cities are confronted with the difficulty in handling municipal waste management such as the collection and disposal systems (Visvanathan, Adhikari, and Ananth, 2007) which accordingly, these inadequacies were caused by insufficient financial resource as well as weak policy enforcement.

The strategic approach that would lead towards a sustainable municipal solid waste management system in the municipalities is the rigorous enforcement of the policy at source segregation, particularly at the household level. It is believed that waste segregation at source, which lead to 3Rs (reduce, reuse and recycle), is a precondition to sustainable solid waste management.

The segregation of waste is all about separation of the entire waste generated at the initial level (Matter, Dietschi, and Zurbrügg, 2013). The effective segregation of waste ensures that collected wastes are treated according to the hazards of the waste and a correct disposal routes are taken. Waste segregation is done based on the compositional makeup of the waste. Waste segregation ensures safety and enhances recycling ability of waste material that is of key to sustainable solid waste management (Ryu, 2010). Sustainable solid waste management will ultimately lead to sustainable development. Basically, waste separation at source is an essential necessity leading to sustainable solid waste management since this activity possesses a multiplier effects notwithstanding the level of growth of the cities. Waste separation at source enables the reduction, reuse and the recycling process, or even waste bank, to take place; without which the waste would be dumped directly to the landfill without reducing the quantity of waste disposed. The regular practice of waste separation and 3Rs would reduce the waste disposed to the landfill, extend its lifespan and minimize the not-in-my-backyard (NIMBY) problems, which poses

huge problem to most cities with conventional municipal solid waste management. Hence, it is significantly necessary to develop and initiate a comprehensive policy to enable the sustainable solid waste management framework to be institutionalized.

## **1.2 Statement of the Problem**

Most Southeast Asia cities are still unable to accomplish sustainable solid waste management (Ngoc and Schnitzer, 2009). There are several practices in sustainable solid waste management and the easiest yet most practical ways is the 3Rs approach (reduce, reuse, recycle) as well as waste segregation at source particularly at the household level. Despite the easy and practical strategy, most urban residents do not perform these measures due to various factors such as the lack of knowledge and awareness, motivation, attitude, support infrastructure, incentive and opportunity (Visvanathan *et al.*, 2007). Due to these constraints, the sustainable solid waste management is too difficult to achieve, or at least too slow to accomplish.

Within the framework of sustainable development, solid waste management becomes necessary for urban citizens (Teguh Kurniawan, 2003 and Sharp, 2012). Numerous studies and researches on this concern have been done mostly focused and undertaken according to the perspectives of developed countries, and therefore gaps were created in developing countries (Bai and Sutanto, 2002; Dyson and Chang, 2005; Zhang, Tan, and Gersberg, 2010; Matsumoto, 2011; Hong Kong Environment Bureau, 2013). In the same vein that research on this issue focusing on a developing city has not been carried out sufficiently and appropriately (Guerrero, Maas, and Hogland, 2013) resulting to inadequate establishment of policies including a poor implementation of sustainable solid waste management program. Thus, this is a fundamental issue that makes this research essential. The absence of appropriate policies on sustainable development in the proposed study area has led to a situation where the city is leading towards wrong direction away from green and clean city. Makassar City in Indonesia, the study area, is one of the cities with insufficient solid

waste management system in many aspects, particularly with respect to sufficiency of policies and system (Nur, 2015).

The local government of Makassar, Indonesia is currently confronted with various issues associated with solid waste management, and thus putting the environment at risk. The environmental risks identified are (1) the continuously increasing volume of waste generated in Makassar City, (2) insufficient policy and legal aspect pertaining to sustainable solid waste management, (3) the poor implementation and operationalization of government policies related to solid waste management particularly on the cooperation between the local government and the community and could be lack of policies and poor decision making process, and (4) poor quality and inadequacy of solid waste transportation, including insufficient financial support for a comprehensive sustainable solid waste management program by the local government (Syahrudin, 2012). For example, the equipment such as truck containers are ageing, with no container cover causing wastes to scatter on the street while transporting, and it emits bad odour (Dilla and Natsir, 2007). In addition, they also introduce another issue on solid waste collection by the government is the inconsistent frequency of collection of wastes from the sources. The situation affects significantly to the NIMBY issues as landfill site would be more frequent to completely filled-up.

In most Indonesian cities, the landfill sites are generally having the capacity of 5-10 years (Yasmin, 2012). By this situation, the city government is perpetually facing the problem on finding land for new landfill site periodically within the range of 5-10 years, because within this span, the landfills are full and reach the maximum capacity. With NIMBY, limited lands, and other factors such as politics, the problem creates headaches for the local government. Waste segregation practices are not commonly implemented in the study area, in addition to lack of policy and wrong path of the authorities towards sustainable solid waste management as well as lack of awareness by the whole solid waste management stakeholders (Towoloe *et al.*, 2016).

Lack of policy and support from the local government, insufficient incentives, lack of willingness to implement sustainable solid waste management from the authority side, and lacks of awareness and feeling of sacrifice from the community side have made the solid waste management activities ineffective. This is why the community can only sell the recyclable waste, not even a continuous waste segregation regardless whether or not recyclable wastes exist. There is actually a potential towards zero landfill through gradual change of habits of the waste management stakeholders such as the community or the neighbourhood, the government and the business sector. For example, considering present composition of waste in Makassar City, when the amount of waste segregation activities covers 70% of the total waste generation in the city, it can extend the life of the landfill site by 50% (Permana *et al.*, 2015). Even though this estimation is on the paper, but this is a potential side of SWM towards sustainable SWM in the study area.

Presently, Makassar City generates about 5,225 cubic meter of waste per day (Central Board of Statistic of Makassar, 2014) and Park and Cleanliness Department of Makassar City (*Dinas Pertamanan dan Kebersihan Kota Makassar*, 2014) responsible to carry out SWM, stated that the Tamangapa Final Disposal Site (FDS) receives approximately 2,089 cubic meter of waste per day. Of the total volume waste generated, there only a maximum of 80% could be collected, hauled and handled by the government's SWM Agency. The Tamangapa FDS is the only landfill site in the city so far. The remaining waste of 20% is left uncollected. There are left on street, backyards and water bodies. The most common means of dealing with this waste is by burning or dumping it to the unused land, in rivers and canals, even though this method has serious environmental consequences, such as local air pollution and increase incidence fire and flooding. But that is the only way in which the waste management authority in Makassar could afford.

The local government of Makassar indicated that based on present volume of Tamangapa FDS, it would only be functional until 2014, although the Tamangapa FDS still currently functions as it is. However, it is projected that the Tamangapa FDS would be used up in a short period of time, and eventually the local government

must again find another site for the substitute of landfill site. This will certainly generate social problems like NIMBY.

The implementation of waste management policy in Makassar City is stipulated in Regional Regulation Number 4 Year 2011. Specifically, the target of waste minimization through waste reduction (reduce), reuse of waste (reuse), and the waste recycling (recycle) are mentioned in Chapter VI Article 10, paragraph 2 points A. However, the full implementations of 3Rs in Makassar City have not been achieved because the volume of waste dumped into the landfill and has increased annually proving that the government of Makassar failed to mobilize the community to practice the 3Rs. Unlike the city of Surabaya where people have successfully practiced 3R in all villages so that only 30% of wastes are sent to the landfill (Damanhuri, 2002).

The poor performance in the implementation of 3Rs in Makassar City, according to Liyanage, Gurusinghe, Herat, and Tateda (2015), was due to the continuous inadequacy of budget allocation for waste management which was considered as one the factors for local government's failure in implementing the 3Rs. In effect, the education and training for additional personnel on 3Rs was hampered at the local or village level because of the limited funds (Nur, 2015). While public awareness campaign of the 3Rs have been held in each district through a government program called Makassar Green and Clean (MGC), the campaign was inadequate as it does not include the fundamental aspects of sustainable solid waste management at community level.

In Makassar City, public awareness on the importance of waste management was still limited to some *Rukun Warga* (RW) communities as the administrative unit of a neighbourhood consisting of 50-100 households. The members within the RW community are motivated to participate voluntarily to undertake waste separation, 3Rs, and make compost in their homes especially for those who are registered as Waste Bank clienteles. In spite of the establishment of RW, the involvement of entire community is far from satisfactory. Amasuomo, Tuoyo, and Hasnain (2015) indicated that local governments could have successfully implemented the 3Rs had it

been adequately supported by policies, continuously encouraging the community to perform the 3Rs, and not throw their garbage indiscriminately as well as not to make vacant lots as garbage disposal area. Moreover, the technology used in transporting the garbage was insufficient and the waste management in the Tamangapa landfill site was likewise unsatisfactory. Typically, the municipal waste of Makassar are hastily transported and discharged into Tamangapa landfill without the benefit of waste separation at the household level, 3Rs, and compost. Thus, only about 30% of the waste is utilized (Syahrudin, 2012).

A number of required operational and technical capabilities that the city government does not sufficiently have can be equivalently substituted by a strong partnership between the city government and the community. This is necessary to augment the implementation of sustainable waste management. The close collaboration between the government and community must be able to create many environmental campaign, since in developing countries including Indonesia, the concept of leadership has a strong influence on communal activities (Yusuf and Permana, 2013; (Nitivattananon, Yusuf, Permana, and Lloyds, 2010). Indonesian society is still very dependent on the existence of a campaign. If a campaign can be found, then the activities can run smoothly. In case of waste management activities in the study area, the campaign seems housewives, because of their proactive motions, as asserted by (Mir and Nabavi, 2015). However, campaigns will not appear without sufficient facilitative condition like government's willingness to provide policies and budgetary allocation in support for the robust implementation of the municipal SWM.

The proposed study attempts to analyse the existing government policies from the viewpoint of sustainable solid waste management practices. The study was conducted in the provincial capital city of Makassar in Indonesia which currently, has inadequate and insufficient implementation of solid waste management policy as a measure for environmental adaptation. The analysis was supported by the public perception of local government failure factors. This study also attempts to analyse the current practices of waste management in the city and the possible solutions for sustainable waste management at the household level. However, this study focuses

on the performance of the households in terms of waste segregation based on existing policies.

Thus, the following research questions are formulated:

1. What are the existing policies and practices on the implementation of sustainable solid waste management in Makassar City?
2. Based on the perceptions of the SWM stakeholders on the present policies and practices, what are the most probable failure factors making the sustainable SWM unsuccessful?
3. Looking at existing gaps and weakness, how to promote the implementation of sustainable solid waste management in the study area?

### **1.3 Research Aim and Objectives of the Study**

This research aims at assessing the existing local government policies and practices on solid waste management and failure factors of the policies based on the analysis on the policies and perception of the solid waste management (SWM) stakeholders towards sustainable solid waste management (SSWM) in Makassar City.

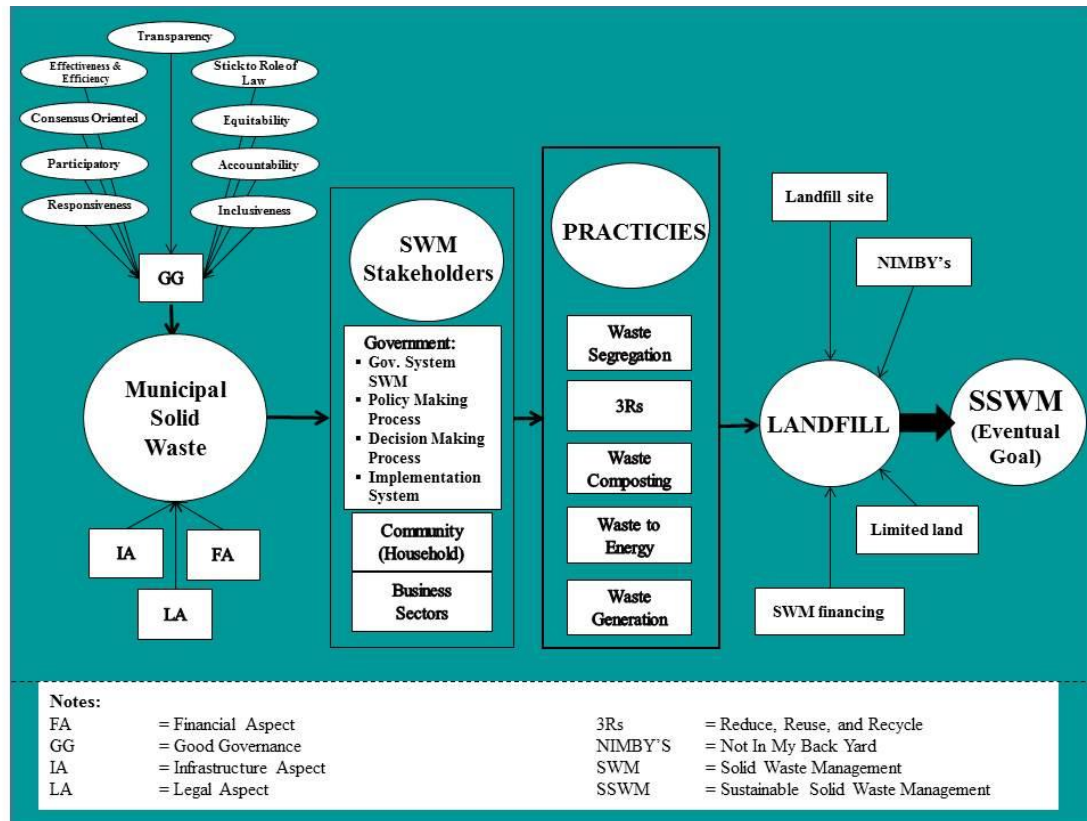
The objectives of this study are as the following:

1. To analyse the household awareness existing policies and practices on the implementation of sustainable solid waste management in Makassar City
2. To analyse the failure factors and practices of the households waste segregation that contributes to the sustainable solid waste management
3. To identify the suitable policies based on existing gaps and failure factors that support the implementation of sustainable solid waste management



## 1.4 Factors of Failure or Success

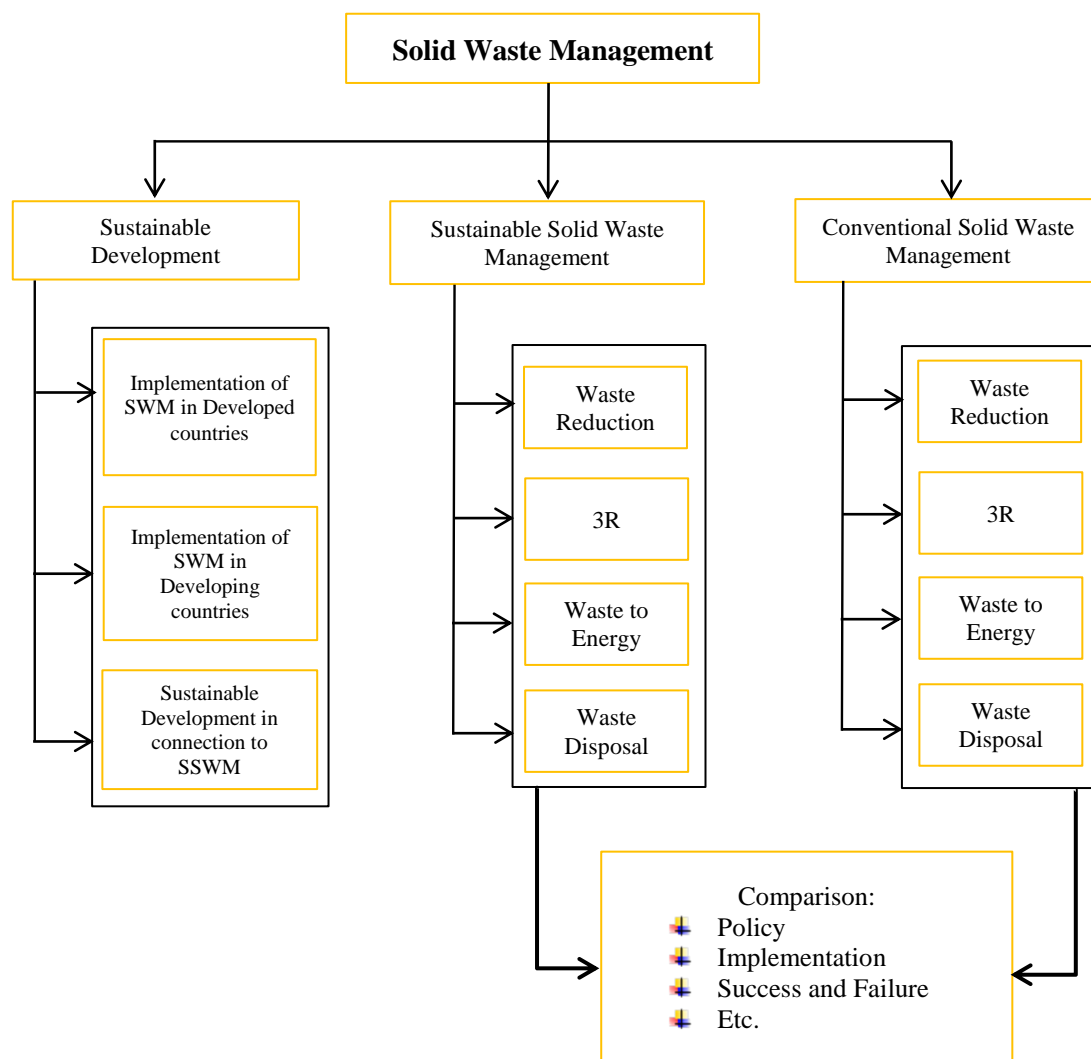
To identify the failure and success factors, the research was conducted with reference to the conceptual framework as exhibited in Figure 1.1. This conceptual framework of the solid waste management basically consists of a process towards SSWM, in which each part might reflect a failure and success factors.



**Figure 1.1** the Conceptual Framework

Figure 1.1 reflects three fundamental parts of the research; those are (1) Good governance and policies (2) Stakeholders of solid waste management and (3) good practices in solid waste management such as waste segregation, 3Rs, waste composting, waste generation, and waste to energy. Another important element of solid waste management is the presence of landfill. The household practices on waste segregation, 3Rs, waste composting, waste generation, and waste to energy and landfill or final disposal site are the last main part of the implementation of

sustainable SWM. The implementation of SWM is successful when the amount of the waste to the landfill or final disposal site (FDS) less than 50 percent. If this condition was going through continuous process, the eventual goal is achieved by SSWM.



**Figure 1.2** Sustainable SWM vs Conventional SWM

Figure 1.2 shows the comparison of sustainable SWM (which is mostly implemented by developed countries) and existing conventional SWM implemented in most developing countries. The developing countries are supposed to benchmark their SWM implementation towards sustainable development practiced in developed countries with necessary adjustment to local conditions.

From the viewpoint of researchers, the solid waste management, either in developed or in developing countries, is consolidated into a common point, which is the need of sustainable solid waste management. In short, sustainable solid waste management can be assessed briefly to the significant reduction of quantity of waste disposal to landfill site, at the same time minimize the quantity of waste generation. The lower the quantity of waste disposal to landfill site and the more the waste reduction by various ways means the more sustainable solid waste management.

Developed countries have been able to cope with the persistent problems of the solid waste management in comparison to their developing countries counterparts. With diverse range of solid waste management level, more developing countries are struggling with persistent basic problems of the poverty, which greatly hampers the implementation of solid waste management towards sustainability.

### **1.5 Research Hypothesis**

Along with research questions to accomplish the research objectives and goal, the following hypotheses are proposed to support the study:

Hypothesis 1: Current government policies have no relationship with implementation of sustainable solid waste management at local level.

Hypothesis 2: Solid waste management policies and practices have no relationship with sustainable SWM implementation in Makassar City.

### **1.6 Scope of the Study**

This study on “Perception of the Community on the Local Government Failure Factors on Sustainable Solid Waste Management in A Developing Country” focuses on the present government policies, the modes and strategies on the

implementation of municipal solid waste management scheme regarding the stakeholder's perceptions on the failure factors of waste management policies and practices in the study area. In order to investigate this study the City of Makassar located in South Sulawesi Province of Indonesia was chosen as this city has stipulated the solid waste management policy but the implementation is still beyond the expectation.

The stakeholders in this study (i.e. regulators, service providers, customers) have provided their perceptions and voice on present policies and practices of sustainable solid waste management in terms of waste segregation, 3Rs practices, waste composting and waste generation. At the same time, the present policies associated with the implementation of sustainable solid waste management were analysed with the benchmark of sustainable solid waste management. The analysis, the stakeholder's perception and current practices on sustainable solid waste management are used to triangulate the case to corroborate the hypotheses and respond to research questions.

## **1.7 Significance of the Study**

Since the study attempts to understand the fundamental aspect of the implementation of sustainable solid waste management in the context of a developing city, which is experienced by many similar cities, the study is significant for the sake of lesson learned for developing cities, in which sustainable solid waste management is still a delusional fact. By understanding the failures factors, the SWM authority and stakeholders can easily recognize and avoid them in order to accomplish the sustainable SWM. The study can also be beneficial for the academe being a product of a comprehensive research involving scientific approaches and tools for analyses in coming up with the research conclusion.

### **1.7.1 Contribution to Academic Entity**

This study is expected to produce new knowledge on the implementation of sustainable solid waste management within the context of developing countries. The implementation of sustainable solid waste management in developing countries cannot directly replicate the same from developed countries, due to difference in socio-economic and cultural aspects.

If a new knowledge on the failing factors of sustainable solid waste management, in the context of developing countries or cities, can be produced by this study, a lesson learnt for many cities – not only in developing countries – will be extremely useful and can help to identify the culprit of unsuccessful solid waste management. The findings will be essential for the development of sustainable solid waste management in developing cities.

### **1.7.2 Contribution to the Practical Purposes**

By understanding the failure factors of the policies and implementations of sustainable solid waste management in the city of Makassar, a lesson learnt is generated which is important to provide a learning process on what to avoid and what to do. Understanding the failure factors of solid waste management can be an essential contribution to the practices of sustainable solid waste management in developing cities. The cities can learn something to accomplish sustainable solid waste management.

## **1.8 Thesis Structure**

The thesis structure consists of seven chapters. Chapter one composes of the introduction, research background, statements of the problem, research aim and

objectives of the study, research hypothesis, significance of the study and thesis structure.

Chapter two discusses the literature review which stipulates sustainable solid waste management, the concepts and principles of sustainable development, solid waste management practices within sustainable development context, and sustainable solid waste management as the eventual goal. This chapter also includes of success factors of implementation sustainable solid waste management in a city.

Chapter three consists of solid waste management in Indonesia and the study area, solid waste management policies and stakeholders. This chapter also includes solid waste management systems at local government.

Chapter four elaborates the methodology of this thesis where by convergent parallel mixed method and triangulation analysis as research design. This chapter also includes quantitative and qualitative method analysis, population, sample size, sample selection, research instrument, quantitative data analysis, chi square analysis, binary logistic regression analysis and qualitative data analysis.

Chapter five consists of the analysis on the implementation of SWM by the community and features the quantitative analysis; basic attribute of the respondents, respondent's perception on solid waste management implemented, household practicing of solid waste management, impact of government policy and household practices on implementation sustainable solid waste management. Finally, this chapter provides the discussion of quantitative findings.

Chapter six discusses the analysis on the current SWM policies and implementation which combines with qualitative analysis, analysis of interview by thematic analysis on solid waste management stakeholders, SWOT analysis, triangulation – first component; respondent's perception, triangulation – second component; expert opinion and triangulation – third component; theoretical views.

Finally, chapter seven consists of the summary of research findings, the solid waste management in Makassar City, the failure factors that weight down the city's solid waste management program. Appropriate solid waste management policy recommendations support the SSWM and contributions to research. The final section in this concluding chapter is the recommendation of related topics which can be the subject for future research.

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